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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/032,295	12/21/2001	Shigeki Yagi	11106/7	4022

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EXAMINER
KIKNADZE, IRAKLI

ART UNIT	PAPER NUMBER
2882	

DATE MAILED: 07/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/032,295	YAGI, SHIGEKI	
	Examiner	Art Unit	
	Irakli Kiknadze	2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 May 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *2* is/are allowed.

6)☒ Claim(s) *1 and 3-10* is/are rejected.

7)☒ Claim(s) *1,4 and 7* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 December 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. In response to the Office action mailed January 16, 2003 the Amendment has been received on May 19, 2003.

Claims 1 and 3 have been amended.

Claims 4-10 have been added.

Claims 1-10 are currently pending in this application.

Claim Objections

2. Claims 1, 4 and 7 are objected to because of the following informalities:

Claim 1, line 3, " monitoring discharge phenomenon" should read -- monitoring a discharge phenomenon --.

Claim 4, lines 1 and 2, " a X-ray tube " should read -- an X-ray tube --.

Claim 7, lines 1 and 2, " a X-ray tube " should read -- an X-ray tube --.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1 and 3 –10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Santurtun et al. (US Patent 4,601,051) in view of Inoue (US Patent 4,376,880).

With respect to claim 1 Santurtun discloses a method of protecting an x-ray analyzer comprising: applying a high voltage to a X-ray tube (31); monitoring discharge phenomenon (as an over-voltage condition monitored by a microprocessor) that occurs in an x-ray generating system as fluctuations of the X-ray tube voltage caused by the discharge phenomenon; and terminating the high voltage output to the X-ray tube when the voltage reaches a predetermined value (Figs. 3a-b; see abstract). Santurtun discloses a pulse-modulated train of pulses controlling the X-ray tube (column 11; line 53 – column 12; line 50) but fails to disclose that a pulse array representing fluctuations of the X-ray tube voltage caused by the discharge phenomenon. Inoue discloses method and apparatus comprising: counting a pulse number of a pulse array representing fluctuations of the apparatus voltage caused by a discharge phenomenon; and terminating a high voltage output when the pulse number reaches a predetermined value (column 2; line 62 – column 3; line 8) for monitoring electric discharge with increased accuracy and reliability (column 2; lines 14-23).

It would have been obvious to one of ordinary skill in art at the time of the invention was made to employ the pulse number counting of the pulse array representing fluctuations of the apparatus voltage of Inoue with the method of protecting an x-ray analyzer of Santurtun, in order to monitor the electric discharge phenomenon

with increases accuracy and reliability for controlling the X-ray analyzer in the manner to achieve an optimum efficiency.

With respect to claim 3, Santurtun discloses an electric discharge detection circuit comprising: an X-ray tube (31); a power supply to generate a high voltage applied to the x-ray tube (31); an x-ray tube voltage detector (32) to detect the high voltage applied to the x-ray tube (31); and a display (49) (column 6; lines 32-55). Santurtun fails to disclose a circuit to discriminate between substantial changes caused by discharge phenomenon in a signal output from the X-ray tube voltage detector within a predetermined time period. Inoue discloses a circuit to discriminate between substantial changes caused by discharge phenomenon in a signal output from a voltage detector within a predetermined time period; a cut-off circuit to terminate generation of the high voltage by a power supply when a number of the substantial changes in a signal output from the voltage detector within the predetermined time period exceeds a preset amount (column 2; line 62 – column 3; line 8) for monitoring electric discharge with increased accuracy and reliability (column 2; lines 14-23).

It would have been obvious to one of ordinary skill in art at the time of the invention was made to employ the circuit to discriminate between substantial changes caused by discharge phenomenon in the signal output from the voltage detector within the predetermined time period of Inoue with the circuit of protecting an x-ray tube of Santurtun, in order to monitor the electric discharge phenomenon with increases accuracy and reliability for controlling the X-ray analyzer in the manner to achieve an optimum efficiency.

With respect to claim 4, Santurtun discloses method for detecting electric discharges of electricity applied to an X-ray tube, comprising steps of: monitoring and identifying fluctuations of a voltage on the X-ray tube (31)(see absteract). Santurtun fails to disclose counting the voltage fluctuations for a predetermined time period. Inoue discloses counting the voltage fluctuations for a predetermined time period and determining that electric discharges occur when a count of the voltage fluctuations reaches a predetermined value within the predetermined time period (column 2; line 62 – column 3; line 8) for monitoring electric discharge with increased accuracy and reliability (column 2; lines 14-23).

It would have been obvious to one of ordinary skill in art at the time of the invention was made to employ determining that electric discharges occur when a count of the voltage fluctuations reaches a predetermined value within the predetermined time period of Inoue with the method of protecting an X-ray tube of Santurtun, in order to monitor the electric discharge phenomenon with increases accuracy and reliability for controlling the X-ray analyzer in the manner to achieve an optimum efficiency.

With respect to claim 5, Santurtun's method modified by Inoue disclosing resetting the count when the predetermined time period elapses (column 3; lines 1-7) would allow to monitor the electric discharge phenomenon with increases accuracy while having no effect on the performance of the X-ray tube because a second pulse does not arise within the time period of set time that is triggered by a first pulse.

With respect to claim 6, starting the predetermined time period when a first fluctuation is identified would allow to monitor the electric discharge phenomenon with

increases accuracy while notify user about starting a minor discharge phenomenon.

With respect to claim 7, Santurtun discloses a device for detecting electric discharges of electricity applied to an x-ray tube, comprising: a monitor that monitors a voltage on the x-ray tube and identifies fluctuations of the voltage (Figs. 3a-b; see abstract). Santurtun fails to disclose a counter that counts the voltage fluctuations for a predetermined time period. Inoue discloses: a monitor that monitors a voltage on the apparatus and identifies fluctuations of the voltage; a counter that counts the voltage fluctuations for a predetermined time period; and a cut-off circuit that cuts off supply of electricity to the x-ray tube when a count of the voltage fluctuation reaches a predetermined value for the predetermined time period (column 2; line 62 – column 3; line 8) for monitoring electric discharge with increased accuracy and reliability (column 2; lines 14-23).

It would have been obvious to one of ordinary skill in art at the time of the invention was made to employ the counter that counts the voltage fluctuations for a predetermined time period of Inoue with the device of Santurtun, in order to monitor the electric discharge phenomenon with increases accuracy and reliability for controlling the X-ray tube in the manner to achieve an optimum efficiency.

With respect to claim 8, Inoue discloses that the monitor includes a differentiation circuit that transforms the voltage fluctuations into pulse arrays (column 4; line 57 – column 5; line 28) which would notify user that an electric discharge phenomenon is taking place.

With respect to claim 9, using a chronometer that starts clocking the predetermined

time period would be obvious preference because it is well known in the art for monitoring time.

With respect to claim 10, Santurtun's device modified by Inoue disclosing resetting the count when the predetermined time period elapses (column 3; lines 1-7) would allow to monitor the electric discharge phenomenon with increases accuracy while having no effect on the performance of the X-ray tube because a second pulse does not arise within the time period of set time that is triggered by a first pulse.

Allowable Subject Matter

5. Claim 2 is allowed.

6. The following is a statement of reasons for the indication of allowable subject matter: with respect to claim 2 prior art fails to disclose or make obvious an electric discharge detection circuit comprising: a zero-crossing comparator to discriminate a polarity of an output signal from the differentiation circuit; a re-triggerable one-shot pulse generating circuit that generates a one-shot pulse at a fixed period, a pulse output from the zero-crossing comparator being a trigger of the one-shot pulse generating circuit; a counter, having a one-shot pulse output from the one-shot pulse generating circuit input as a operation enable signal, to count pulses output from the zero-crossing comparator during a period when operation is enabled as claimed in claim 2.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Amtmann (US Patent 4,234,793) discloses an X-ray diagnostic senator for operating with falling load.

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Irakli Kiknadze whose telephone number is (703) 305-6464. The examiner can normally be reached on M-F(8:30-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (703) 308-4858. The fax phone numbers for

the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Irakli Kiknadze
July 11, 2003

EDWARD J. GLICK
EXAMINER
TECHNOLOGY CENTER 2800